• List and describe the parts of a ladder.
• Describe the different types of ladders.
• Describe how to clean, inspect, and store ladders.
• Describe when, where, and who performs service testing on ladders.
• Specify the hazards with ladders.
Introduction

• The fire service ladder is one of the most basic fire fighter tools.
• Ladder technology has not changed much over the years.
• Every fire fighter must be proficient in working with ladders.
Primary Functions of a Ladder

- Provides a vertical path between grades
- Provides an escape path and a means to evacuate people
- Can be used as a working platform
- Can bridge a small opening
Secondary Functions of a Ladder

• Provides stable footing and distribute weight on pitched roofs
• Creates a ladder structure to raise or lower people or objects
• Provides a platform for equipment
• Creates a ramp for equipment or patients
• Creates a water chute (channel)
Ladder Construction

• Fire service ladders are similar to other types of ladders.
  – But are specialized tools not general purpose ladders
• Require heavy-duty construction
• Require more frequent and thorough maintenance
Basic Ladder Components

- Beams
- Rail
- Truss block
- Rung
- Tie rod
- Tips
- Butts
- Roof hooks
- Heat sensor labels
- Protection plates
Beams

- Run the length of most ladders
- Three types of beam construction:
  - Trussed beam
  - I-beam
  - Solid beam
Rail and Truss Block

• Rail
  – Top or bottom section of a trussed beam
  – May also refer to top and bottom surfaces of an I-beam

• Truss block
  – Piece that connects the two rails of a trussed beam
Rung and Tie Rod

• Rung
  – Crosspiece that spans the two beams of a ladder
  – Serves as steps and distributes user’s weight

• Tie rod
  – Metal bar that runs from one beam of the ladder to the other to keep the beams from separating
Tip, Butt, and Butt Spurs

• Tip
  – Very top of the ladder

• Butt
  – End of the ladder that is placed against the ground

• Butt spurs
  – Metal spikes attached to the butt of a ladder
Butt Plate and Roof Hooks

• Butt plate or footpad
  – Alternative to a simple butt spur
  – Incorporates both a spur and a cleat or pad

• Roof hooks
  – Spring-loaded, retractable, curved metal pieces attached to the tip of a roof ladder
  – Used to secure the ladder to the peak of a pitched roof
Heat Sensor Label and Protection Plates

• Heat sensor label
  – Identifies when the ladder has been exposed to specific heat conditions
  – Changes color when exposed to a particular temperature

• Protection plates
  – Reinforcing pieces placed at chaffing and contact points to prevent damage
Extension Ladder Components

- Bed section
- Fly section
- Guides
- Halyard
- Pawls
- Pulley
- Stops
- Staypoles
Bed Section and Fly Section

• Bed section
  – Widest section
  – Serves as the base

• Fly section
  – Part that is raised or extended from the bed section
  – Each fly section extends from the previous section
Guides and Halyard

• **Guides**
  – Strips of metal or wood that guide a fly section as it is extended

• **Halyard**
  – Rope or cable used to extend or hoist the fly sections
Pawls and Pulley

• Pawls
  – Mechanical locking devices used to secure the fly sections of an extension ladder

• Pulley
  – Small grooved wheel used to change the direction of the halyard pull
Stops and Staypoles

• Stops
  – Pieces of wood or metal that prevent the fly sections from overextending and collapsing

• Staypoles
  – Long metal poles attached to the top of the bed section
  – Help stabilize the ladder as it is raised and lowered
Types of Ladders

- Aerial ladders
- Elevating platform
- Extension Ladder
- Bangor Ladder
- Combination Ladder
- Folding Ladder
- Fresno Ladder

Courtesy of Dennis Wetherhold, Jr.
• Elevated Platform.
Straight Ladder (Hook Ladder)
• Extension Ladder
• Combination Ladder
• Folding Ladder
• Fresno Ladder
Inspection, Maintenance, and Service Testing

- NFPA 1931 establishes requirements for ladder construction.
- NFPA 1932 provides general use guidance.
  - Regular inspection, maintenance, and testing
Inspection

• NFPA 1932 requires ground ladder visually inspected monthly or after each use
  – Splintering, cracking, deformity, breaks, gouges, fraying, or other conditions
  – Components fit snugly and operate smoothly.
  – Heat sensor label for discoloration.

• If deficiencies are revealed, remove ladder from service and repair it.
Maintenance

• Basic maintenance tasks:
  – Clean and lubricate the dogs and slides.
  – Replace worn halyards and wire rope.
  – Clean and lubricate roof hooks.
  – Maintain finish.
  – Replace ladder in storage racks.
Cleaning

• Clean regularly and after each use with warm, soapy water and a soft-bristle brush.

• Dry ladder before storing it.
Service Testing

- NFPA 1932 requires periodic testing.
- Test new ladders before use and annually thereafter.
- Test ladders after any repairs.
- Maintain service and testing records.
Ladder Safety

• Several potential hazards are associated with ladder use.
• Use with caution and follow manufacturers’ recommendations.
General Safety Requirements

• Use full personal protective equipment (PPE) around ladders.
• Fire fighters must be able to work with and on ladders while wearing self-contained breathing apparatus.
THANKS COMRADES!!